CS101- Algorithms and Programming I

Lab 03

Lab Objectives: Decisions `(if/else)`

- For all labs in CS 101, your solutions must conform to these CS101 style guidelines (rules!)
- Create a Lab03 workspace (i.e. the folder H:\private\cs101\lab03). This assignment has parts a, b, c, d, and e, each of which should be placed in a separate project within the same Lab03 workspace. Note: only one project is active at a time. To work (Build/Run) a different project, right click on the project's name and select "Set as active project".
- You can only use `if/else` statements for this lab assignment. You cannot use any repetition statements.

Part A.

For this question, create a new project **Lab03a**. You should input two strings from the user. Print by appending them (known as "concatenation"). However, if the concatenation creates a double-char, then omit one of the chars. The string inputs can be empty. See the sample runs below.

Sample Runs:

```
> run Lab03a
Please enter the first string:
Please enter the second string: cat
--> cat
> run Lab03a
Please enter the first string: cat
Please enter the second string: elyn
--> catelyn
> run Lab03a
Please enter the first string: cat
Please enter the second string: turkey
--> caturkey
> run Lab03a
Please enter the first string: abc
Please enter the second string: cddba
--> abcddba
```

Part B.

According to a study published in the British Journal of Nutrition in 1991, if you are an adult, your percentage of body fat can be estimated… Remember the question? Yes, you did it in Lab01. We'll continue to add a bit more stuff to that question. In that question, you did calculate the BFP for male. Create a new project **Lab03b.** Copy-paste the code from the **Lab01b**. Change the solution so that you take necessary inputs from the user instead of setting values to variables. In this question, your task is to decide whether a male is underfat, healthy, overweight, or obese using BFP and age parameters. You can use the information table below. See the sample run below.

	Underfat	Healthy	Overweight	Obese
18-40 years	< 21	[21, 33)	[33, 39]	> 39
41-60 years	< 23	[23, 35)	[35, 40]	> 40
61-79 years	< 24	[24, 36)	[36, 42]	> 42

Sample Runs:

```
> run Lab03b
Please enter age: 45
Please enter weight: 100
Please enter height: 1.65
Based on a height of 1.65 and weight of 100 and age of 45, your BFP is 38.23
--> OVERWEIGHT
> run Lab03b
Please enter age: 45
Please enter weight: 50
Please enter height: 1.65
Based on a height of 1.65 and weight of 50 and age of 45, your BFP is 16.19
--> UNDERFAT
```

Part C.

Create a new project **Lab03c**. Your program will input three integers and displays them in ascending (non-decreasing) order. See the sample runs below.

Sample runs:

```
> run Lab03c
Please enter the integers: 98 56 -10
The sorted nums are: -10 56 98
> run Lab03c
Please enter the integers: -27 65 56
The sorted nums are: -27 56 65
```

Part D.

- Create a new project **Lab03d.** For this question, your program will input three integers and decide whether those numbers would constitute a equilateral, isosceles, or scalene triangle. *Note that* those numbers have to be able to form a triangle first. For that you may use triangle inequality. Try to do it using a Boolean variable to keep the information whether the values form a triangle or not.

- In mathematics, the triangle inequality states that for any triangle, the sum of the lengths of any two sides must be greater than the length of the remaining side. Print a warning message and stop if the values are invalid. See the sample runs below.

Sample Runs:

```
> run Lab03d
Please enter the side lengths: 5 5 -1
Side lengths: 5 5 -1
The side lengths must be positive.
> run Lab03d
Please enter the side lengths: 5 5 11
Side lengths: 5 5 11
The numbers do not form a triangle.
> run Lab03d
Please enter the side lengths: 5 5 7
Side lengths: 5 5 7
The numbers form a ISOSCELES triangle.
> run Lab03d
Please enter the side lengths: 3 4 5
Side lengths: 3 4 5
The numbers form a SCALENE triangle.
> run Lab03d
Please enter the side lengths: 6
8
10
Side lengths: 6 8 10
The numbers form a SCALENE triangle.
```

Part E. *ZODIAC SIGNS*

Create a new project **Lab03e**. Your program prompts the user to enter two integers that correspond to the day and the month of the user's birthday and prints the corresponding Zodiac sign using the following table. Assume that each month has 31 days for this question. Still you have to validate your input. See the sample runs below.

Zodiac Sign	Dates of Birth
Aries	March 21st – April 19th
Taurus	April 20th – May 20th
Gemini	May 21st – June 20th
Cancer	June 21st – July 22nd
Leo	July 23rd – August 22nd
Virgo	August 23rd – September 22nd
Libra	September 23rd – October 22nd
Scorpio	October 23rd – November 21st
Sagittarius	November 22nd – December 21st
Capricorn	December 22nd – January 19th
Aquarius	January 20th – February 18th
Pisces	February 19th – March 20th

Sample Runs:

```
> run Lab03e
Please enter your birthday (month and day): 8 25
The astrological sign for 8 25 is Virgo
> run Lab03e
Please enter your birthday (month and day): 13 20
You have entered incorrect month!
> run Lab03e
Please enter your birthday (month and day): 2 30
The astrological sign for 2 30 is Pisces
> run Lab03e
Please enter your birthday (month and day): 9 32
You have entered incorrect day!
```